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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of: Sosa

Serial No.: 10/729,446

Confirmation No.: 1024

Filed: December 5, 2003

For: Impact Modified Polystyrene and
Process for Preparing Same

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Group Art Unit: 1711

Examiner: Asinovsky

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Honorable Commissioner:

CERTIFICATE OF MAILING

37 CFR 1.10

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1/30/06
Date

Signature

TRANSMITTAL LETTER

In connection with the above identified application, Applicants respectfully resubmit the following in response to the Notice of Non-Compliant Appeal Brief dated January 20, 2006:

1. Appeal Brief.

Respectfully submitted,

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APPEAL BRIEF

Applicants submit this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1711 dated April 11, 2005, finally rejecting claims 1-30.

Real Party in Interest

The present application has been assigned to Fina Technology Inc., P.O. Box 674412, Houston, Texas 77267.

Related Appeals and Interferences

Appellants assert that no other appeals, interferences or judicial proceedings are known to the Appellants, the Appellants' legal representative or Assignee that will

directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1-30 are pending in the application and were originally presented in the application. Claims 1-5, 8 and 18 stand rejected under 35 U.S.C. §102(b) and claims 6-7, 9-17 and 19-30 stand rejected under 35 U.S.C. §103(a). The rejection of the pending claims is appealed. The pending claims are shown in the attached Appendix A.

Status of Amendments

No amendments have been made to the pending claims.

Summary of the Claimed Subject Matter

Unmodified polystyrene is well suited to applications where brittleness is acceptable. However, some applications require polystyrene having less brittleness than unmodified polystyrene. Therefore, polystyrene resins modified with organic rubber particles (HIPS) may be used in applications requiring less brittleness. *See*, specification, at least page 1, lines 20-30. One method of making HIPS is to first dissolve a rubber in styrene monomer and then polymerize the monomer. *See*, specification, at least page 2, lines 7-10.

Embodiments of the present invention include forming HIPS. *See*, specification, at least page 5, lines 1-5. In contrast to opaque HIPS, the HIPS described herein includes a modifier (*e.g.*, block copolymer or rubber) that results in a HIPS having a haze value of less than or equal to 12 percent. *See*, specification at least page 9, line 22 to page 10, line 5. In one embodiment, the HIPS has a M_z/M_n of at least 4.1. *See*, specification at least page 10, lines 14-25 and page 11, paragraph 35. Further, in one embodiment, the styrene-butadiene-styrene block copolymer is a tapered block copolymer having a styrene content of about 70 percent, a M_w of from about 50,000 to about 250,000 Daltons and is present at a concentration of from about 5 to about 20 percent. *See*, specification at least page 6, paragraphs 19-20 and page 5, paragraph 16-17.

Grounds of Rejection to be Reviewed on Appeal

1. The rejection of claims 1-5, 8 and 18 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,437,043 (*Sosa* '043).
2. The rejection of claims 6-7, 9-17 and 19-30 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,437,043 (*Sosa* '043) in view of U.S. Patent No. 5,633,318 (*Bowen*).

Arguments

I. THE EXAMINER ERRED IN REJECTING CLAIMS 1-5, 8 AND 18 UNDER 35 U.S.C. §102(b) AS BEING ANTICIPATED BY *SOSA* BECAUSE *SOSA* DOES NOT TEACH HIGH IMPACT POLYSTYRENE.

Applicants personally interviewed the pending claims with the Examiner on January 12th, 2005, where the Examiner concurred with the Applicants' argument that the composition of *Sosa* is not identical to the composition as claimed. However, the Examiner issued a Final Rejection on April 11, 2005.

The Examiner stated that "there is no morphology structure for SBS rubber phase" and therefore the "process for making HIPS... is readable in *Sosa* '043." *See*, Advisory Action. Applicants claim an impact modified polystyrene having a haze value of less than or equal to 12 percent. Applicants' "impact modified polystyrene" is a "High Impact Polystyrene" as defined by the specification. *See*, specification, at least paragraphs 3-4 and 15. ("Another method of making HIPS is to first dissolve a rubber in styrene monomer and then polymerize the monomer. Such polymers are disclosed in U.S. Patent No. 6,569,941 *Sosa, et al.* In the practice of the method of the present invention of preparing an impact polystyrene, a styrene-butadiene-styrene copolymer is dissolved in a styrene monomer and then the styrene monomer is polymerized. This process is a solution polymerization process and can be performed in any fashion known to be useful to those of ordinary skill in the art of performing such processes. For example, the impact modified polystyrene of the present invention can be prepared using the process disclosed in U.S. Patent No. 6,569,941 (*Sosa, et al.*)")

In contrast, *Sosa* '043 teaches Transparent Impact Modified Polystyrene (TIPS), which is not the same product as HIPS, regardless of whether the HIPS is transparent. As

stated previously, *Sosa '043* expressly distinguishes the differences between TIPS and HIPS. “[T]he primary difference between a HIPS material and a TIPS material arises from the difference in the morphologies of the two materials’ rubber phases. In the HIPS material, the rubber is present as a distribution of different sized well-defined spherical particles, ranging from about 0.5 up to about 15 microns in diameter. In TIPS materials, the rubber phase is present in ‘domains’ that have dimensions that will not refract visible light, and therefore appear to the human eye as transparent” (*e.g.*, the rubber morphology that was previously discussed.) *See*, column 1, lines 30 to 40. Further, *Sosa '043* is directed to making TIPS materials using an elastomers reactor system that is unique to TIPS manufacture. *See*, column 4, lines 3 to 25. Accordingly, *Sosa '043* does not teach, show or suggest a HIPS material having a haze value of less than or equal to 12 percent, as recited in the pending claims.

Accordingly, Applicants respectfully request reversal of the rejection.

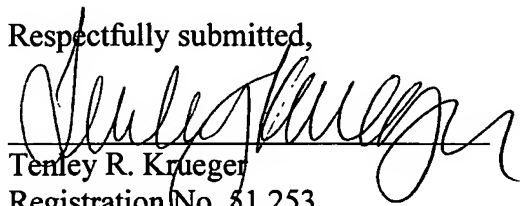
II. THE EXAMINER ERRED IN REJECTING CLAIMS 6-7, 9-17 AND 19-30 UNDER 35 U.S.C. §103(a) AS BEING UNPATENTABLE OVER *SOSA '043* IN VIEW OF *BOWEN* BECAUSE *BOWEN* DOES NOT TEACH TRANSPARENT IMPACT POLYSTYRENE AS TAUGHT IN *SOSA '043*.

As demonstrated above, *Sosa '043* teaches a Transparent Impact Polystyrene, not HIPS. *Bowen* does not teach HIPS having a haze value of less than 12%. In fact, *Bowen* teaches an opaque film. *See*, column 4, at least lines 12-15. Accordingly, there is no motivation to combine *Bowen* with *Sosa '043* for the purpose of providing the missing limitations in *Sosa '043* (*e.g.*, HIPS.) Accordingly, Applicants respectfully request reversal of the rejection.

Conclusion

In conclusion, *Sosa '043* does not teach or suggest a high impact polystyrene having a haze value of less than or equal to 12 percent. Further, there is no motivation to combine the opaque polystyrene of *Bowen* with *Sosa '043* to form a High Impact Polystyrene having a haze value of less than or equal to 12 percent, as recited in the pending claims. Thus, Applicants respectfully request reversal of the rejections of claims 1-30.

Respectfully submitted,



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Appendix A

Pending Claims

1. A composition comprising an impact modified polystyrene prepared using a process comprising dissolving a styrene-conjugated diene-styrene block copolymer in styrene monomer and polymerizing the styrene monomer wherein the impact modified polystyrene has a haze value of less than or equal to 12 percent.
2. The composition of Claim 1 wherein the conjugated diene is butadiene.
3. The composition of Claim 2 wherein the impact modified polystyrene has a haze value of less than or equal to 8 percent.
4. The composition of Claim 2 wherein the impact modified polystyrene has a haze value of less than or equal to 6 percent.
5. The composition of Claim 2 wherein the styrene-butadiene-styrene block copolymer has a general formula:
$$\text{S-B-S}$$
wherein S is styrene and B is butadiene or isoprene.
6. The composition of Claim 2 wherein the styrene-butadiene-styrene block copolymer has a general formula:
$$(\text{SB})_n\text{X}.$$
wherein X stands for the residue of a coupling agent; and n is more than 1.
7. The composition of Claim 2 wherein the styrene-butadiene-styrene block copolymer has a molecular weight range of from about 2,000 to 300,000 Daltons.
8. The composition of Claim 2 wherein the styrene-butadiene-styrene block copolymer has a styrene content of at least 50 percent.

9. The composition of Claim 2 wherein the styrene-butadiene-styrene block copolymer is a tapered block copolymer.
10. The composition of Claim 2 wherein the impact modified polystyrene has a ratio of M_z/M_n of at least 4.1
11. The composition of Claim 2 wherein the impact modified polystyrene has a ratio of M_z/M_n of from about 5.5 to about 25.
12. The composition of Claim 2 wherein the impact modified polystyrene has a ratio of M_z/M_n of from about 7 to about 22.
13. The composition of Claim 2 wherein the impact modified polystyrene has a melt flow index of from about 2 to about 6 g/10 minutes.
14. The composition of Claim 2 wherein the impact modified polystyrene has a melt flow index of from about 6 to about 14 g/10 minutes.
15. The composition of Claim 2 additionally comprising an additive selected from the group consisting of fillers, chain transfer agents, talc, anti-oxidants, UV stabilizers, lubricants, mineral oil, plasticizers, and mixtures thereof.
16. The composition of Claim 1 wherein the impact modified polystyrene is prepared using a process further comprising polymerizing the styrene monomer and in the presence of a chain transfer agent.
17. The composition of Claim 17 wherein the chain transfer agent is n-dodecyl mercaptan (NDM) and the NDM is present at a concentration of from about 50 to about 500ppm.

18. A process for preparing an impact modified polystyrene comprising dissolving a styrene-butadiene-styrene block copolymer in styrene monomer and polymerizing the styrene monomer wherein the impact modified polystyrene has a haze value of less than or equal to 12 percent.
19. The process of Claim 18 wherein the polymerization is initiated thermally.
20. The process of Claim 19 wherein the polymerization is initiated using a chemical polymerization initiator.
21. The process of Claim 18 additionally comprising using a solvent to dissolve the styrene-butadiene-styrene copolymer.
22. The Process of Claim 21 wherein the solvent is selected from the group consisting of ethylbenzene, toluene, xylenes, cyclohexane, dodecane, and mixtures thereof.
23. The process of Claim 18 further comprising polymerizing the styrene monomer and in the presence of a chain transfer agent.
24. The process of Claim 23 wherein the chain transfer agent is NDM and the NDM is present at a concentration of from about 50 to about 500ppm.
25. A composition comprising an impact modified polystyrene prepared using a process comprising dissolving a styrene-butadiene-styrene block copolymer in styrene monomer and polymerizing the styrene monomer wherein the impact modified polystyrene has a ratio of M_z/M_n of at least 4.1.
26. The composition of Claim 25 wherein the impact modified polystyrene has a ratio of M_z/M_n of from about 5.5 to about 25.

27. The composition of Claim 25 wherein the impact modified polystyrene has a ratio of M_z/M_n of from about 7 to about 22.

28. The composition of Claim 25 wherein the impact modified polystyrene has a haze value of less than or equal to 12 percent.

29. A process for preparing an impact modified polystyrene comprising dissolving a styrene-butadiene-styrene block copolymer in styrene monomer and polymerizing the styrene monomer wherein the impact modified polystyrene has a M_z/M_n of at least 4.1.

30. A composition comprising an impact modified polystyrene prepared using a process comprising dissolving a styrene-butadiene-styrene block copolymer in styrene monomer and polymerizing the styrene monomer wherein the impact modified polystyrene has a haze value of less than or equal to 12 percent, the styrene-butadiene-styrene block copolymer is a tapered block copolymer having a styrene content of about 70 percent, a M_w of from about 50,000 to about 250,000 Daltons, and is present at a concentration of from about 5 to about 20 percent.

Appendix B
Evidence

Not Applicable

Appendix C
Related Proceedings

Not Applicable